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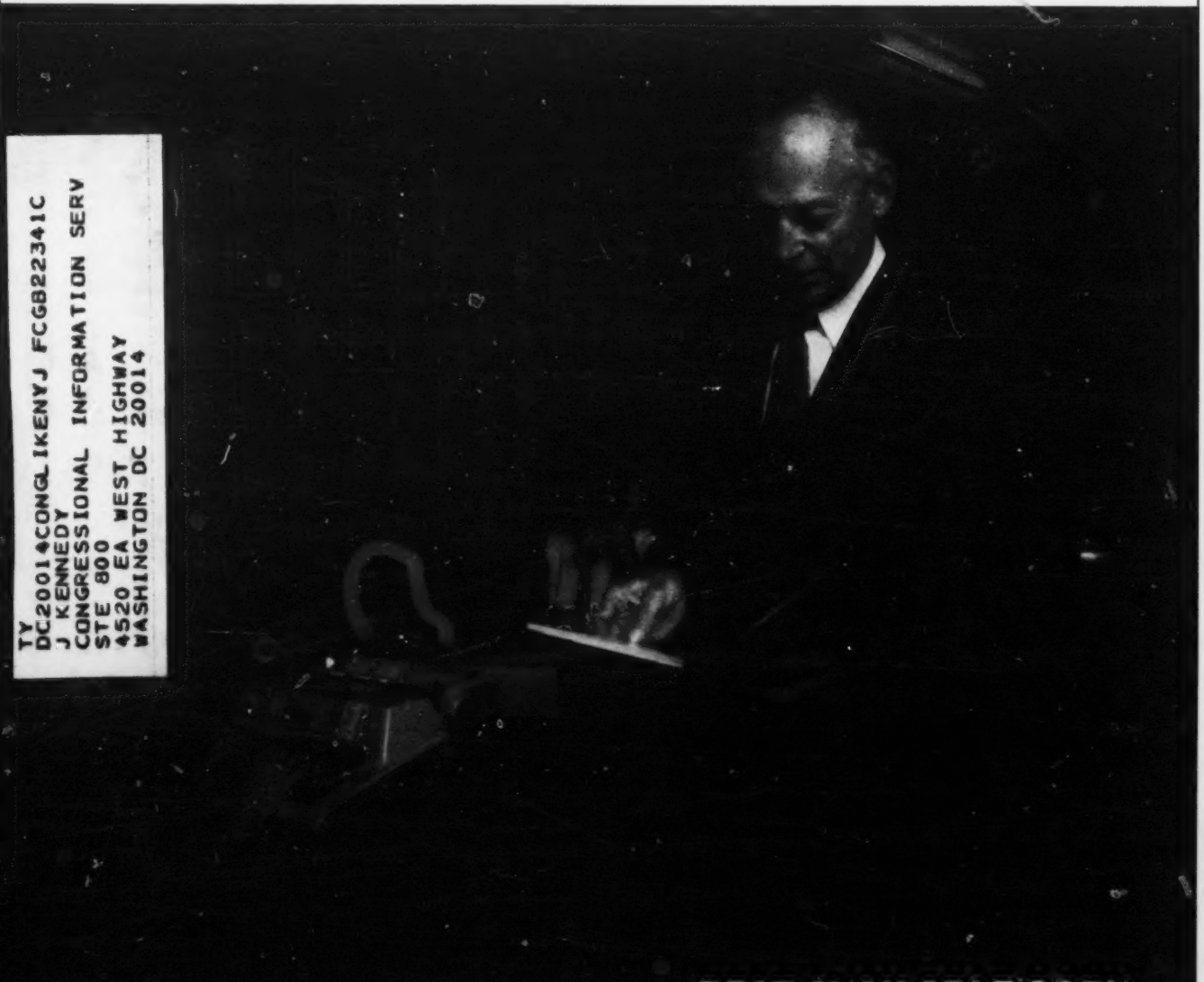

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Cost model plus field trials reduce profit uncertainties of videotex

A quantitative model of costs and revenues provides a framework to analyze the potential profitability and viability of commercial videotex systems

MICHAEL TYLER and HILARY B. THOMAS

THE RAPIDLY INCREASING revenues being devoted to the development of videotex and similar electronic information and transaction services make it urgent to assess their potential for commercial viability and profitability.

Such an analysis can only be conducted with a quantitative model of costs and revenues. The importance of modeling costs and revenues is increased rather than decreased by the various field trials, market trials and start-ups of commercial services. Because most of the cost and revenue characteristics of such trials or services change radically as they progress from the field trial or market trial stage to full-scale operation, trials are not a substitute for quantitative modeling.

Rather, the two activities are complementary. The modeling work helps to identify the key business uncertainties. The trials and service start-ups provide data that can be incorporated in the models to make them more realistic. Throughout, the quantitative modeling process provides a framework for calculating what this data, when obtained, imply for the potential profitability of future full-scale systems or services.

This article outlines the approach Communications Studies and Planning International Inc., New York, has adopted toward assessing expected revenues, costs and profits for a mass market, residential, two-way videotex service in North America. As such, it represents a synthesis of much of the research done for the company's inContext Program, which studied the business viability of residentially-oriented videotex services. The program also examined electronic publishing and transaction services. It models the revenues and costs facing a system operator not involved in the information or service provision ends of the business on any large scale.

Similar methods could be used to analyze other kinds of videotex or related businesses, such as the information provider business, vertically-integrated broadcast or cable teletext services, and business information services.

The analysis is for a mass market, general interest videotex system with information retrieval (electronic publishing), transaction and messaging capabilities. Only revenues from households are considered, although other kinds of systems, such as specialized or business-oriented systems, could be analyzed also.

As of the end of 1981, no commercial videotex system in North America had yet achieved profitability, with the possible exception of Dow Jones' specialized business services for personal computer users. There are large start-up costs and scale-up problems involved, so this is not surprising. It is to be expected that losses will be reported in the early years. Whether and how a videotex system makes a profit is a vital question; but it is one that cannot be answered except with a mathematical model that, by extrapolation from the available cost and revenue data, seeks to show

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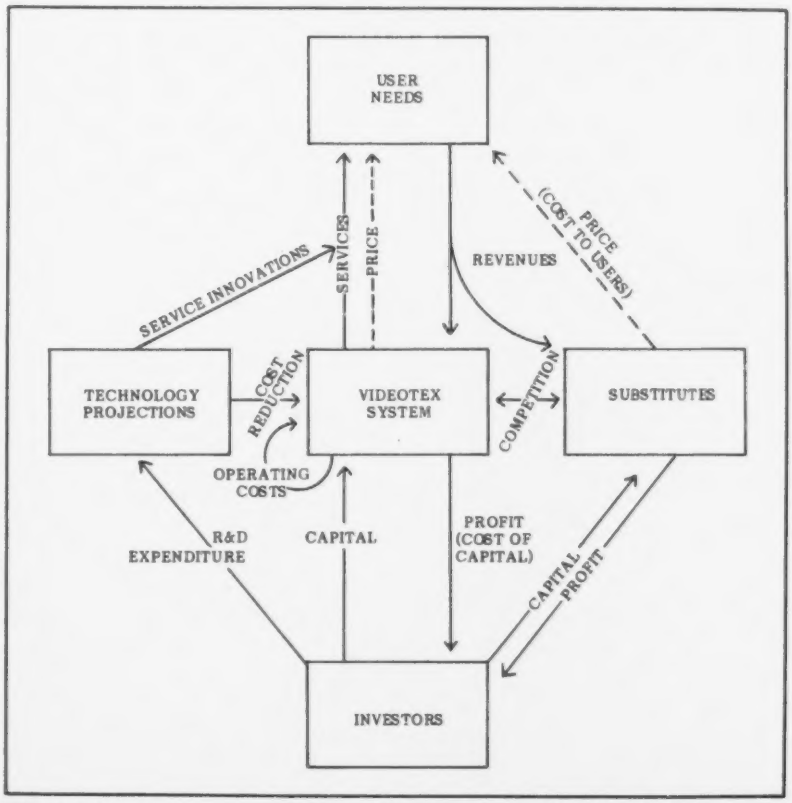

FIG. 1 *Schematic diagram of factors which affect the profitability of a videotex operation.*

Michael Tyler is President, and *Hilary B. Thomas* is Director of Communications Studies and Planning International Inc., New York. This report will be presented at Viewdata '82, Oct. 12-14, in London.

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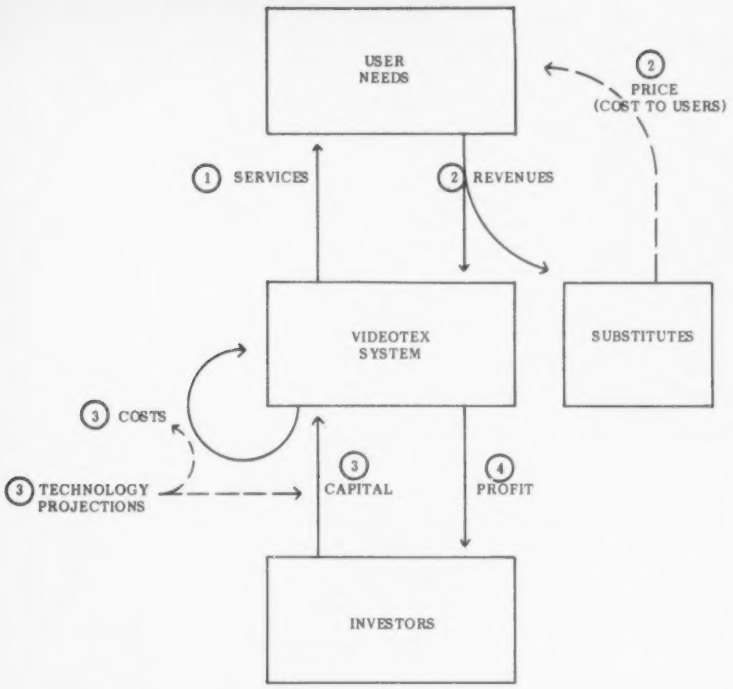
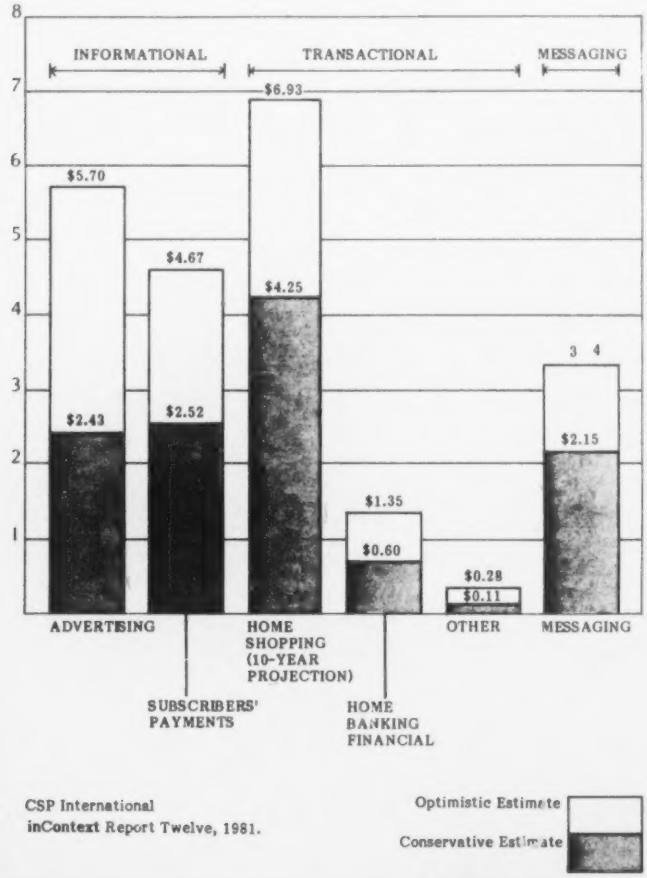


FIG. 2 *(above) Outline of the analytical approach.* **FIG. 3** *(below) Components of estimated potential revenue for an average household per month.*



Source: CSP International inContext Report Twelve, 1981.

whether a full-scale videotex system could be efficiently profitable once scaled-up to show an acceptable return on investment (ROI) over its total life.

The unfamiliarity of videotex and similar services to users and the way costs and revenues per subscriber change dramatically as the scale of operations increases imply that there will be a period of several years before profit potential can be fully tested in the marketplace.

For example, it is not possible to realize full revenue potential until a complete range of high-quality data bases and transaction services can be provided. Information and service providers are not likely to invest in service offerings until there are a substantial numbers of users and revenue potential has been demonstrated.

Similarly, the true costs of building and operating a videotex system will not be apparent until the traffic-handling capacity and quality of service provided by full-scale configurations of the computer communications system are measured in practice and considerable experience has been accumulated. Field trial or market trial systems with a few hundred users consequently can yield only partial evidence on commercial viability, even when they are well-designed.

The discipline of business modeling focuses attention on the specific information needs that a trial and the associated data collection and evaluation processes should meet. The modeling work provides a systematic framework to interpret the separate items of cost, usage and revenue data that a trial generates, and thus reduces key business uncertainties.

The interactions between the variables that influence the profitability of an operational videotex system are very complex. They are illustrated at a broad conceptual level in Figure 1. The problem facing the practical analyst at the present early state of videotex development is finding a simple representation which captures the main interactions well enough to provide an approximate but broadly reliable indication of whether videotex systems can be profitable.

The stages of analysis are shown in Figure 2. In the first stage, we reviewed the present characteristics in broad terms, including cost trends, of various businesses where videotex may offer a quicker, cheaper, more

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capable and even more pleasant way for households to transact particular types of business. We also surveyed various precursor activities—activities which are already performing some of the functions that we expect will be performed by videotex systems—for an early indication of the role which videotex can be expected to play.

The next step, or the second stage, was to develop a detailed revenue analysis for each of the areas of business where, on the basis of preliminary work, videotex appeared to provide an attractive alternative to conventional non-electronic methods of operation for at least some functions or some types of users. The analysis depended on the quantification of economic activities in the areas where videotex services have been defined, and on an assessment of the likely share of this activity which a developed videotex service might capture.

The cost of setting up and operating a videotex system for the mass market home user was analyzed in the third stage. This analysis depended in part on a projection of technology and in part on an analysis of operating requirements.

Finally, the profitability of videotex operation, the fourth stage, was assessed on the basis of the cost and revenue estimates previously developed.

Indicators of potential demand

The most promising areas of videotex demand are those in which conventional methods of providing a service show rising costs, in which demand is buoyant and which are suited to the videotex method of delivery.

Two kinds of analyses are helpful in approaching the problem of assessing the commercial viability of videotex:

- Trends of economic performance favoring the long-term prospects of videotex; and
- Developments in services and technologies related to videotex which might be considered precursors to videotex services.

Economic trends favor the long-term prospects for videotex development. One factor is the long-standing trend of replacing labor with capital. The maintenance and improvement of the standard of living in Western economies has depended on continuous investment of capital resources to increase productivity. This has been most noticeable in many manufacturing industries.

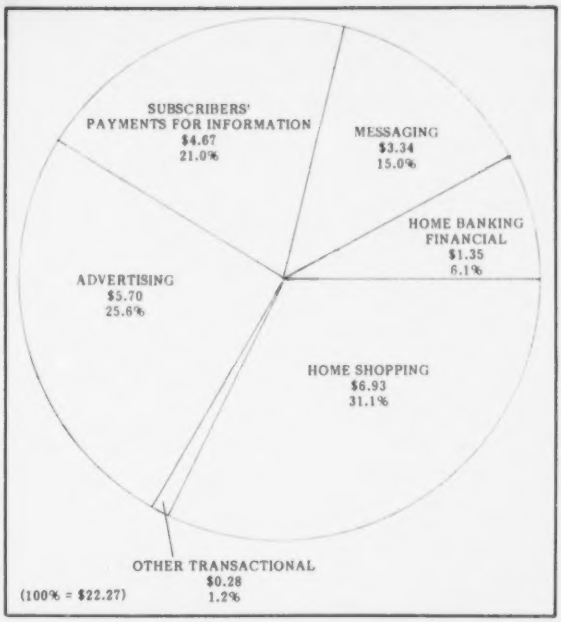

FIG. 4 *Composition of estimated per-household revenue on optimistic estimates of revenues (%).*

By comparison, the capital investment allocated to enhance the productivity of information processing has lagged significantly behind levels in industrial occupations. Videotex offers opportunities to facilitate three currently labor-intensive activities: transaction processing, message handling and information retrieval.

Transaction processing, including billing and bill payment, banking and direct selling to the home, represents a very large area of business. Although some technological developments, such as optical character recognition (OCR), have improved its efficiency, transaction processing remains labor-intensive and expensive. Videotex transactions, which are entered by the customer in electronic form, can provide an important area for service development with high productivity and low unit costs.

The physical transmission of messages, a fundamentally labor-intensive process, has become increasingly expensive in real terms. Thus, mass electronic dissemination of messages through a medium such as videotex is likely to become increasingly attractive.

Although perhaps less important from a productivity standpoint than transaction processing and message handling, information retrieval and publishing are also labor-intensive activities. The comparative advantage of electronic media for these activities is increasing rapidly.

Initial evidence of the viability of videotex systems can be gained from precursors of various applications of videotex. Precursors to fully-developed videotex transaction processing can be found in financial services, shop-at-home services and mail order retailing, all of which are being tested in North American markets.

In financial services three significant developments are the introduction of bill paying by telephone, the rapid expansion in the provision and use of automatic teller machines (ATMs), and the introduction of the debit card.

As conceived, videotex home banking services usually will permit two kinds of functions. One is an information and accounts-management system through which customers can make balance inquiries, transfer funds between accounts, and conduct other banking activities. The other is a bill paying system.

ATMs and bank-by-phone systems each represent precursors of one of the pieces of the potential videotex service package. Many ATMs, for example, permit balance inquiries and transfers between accounts. Bank-by-phone services are analogs of a videotex bill paying system; the eventual replacement of a human operator makes the economics of a videotex system more attractive to banks.

The existence of ATMs is important for several additional reasons. Their use will make consumers accustomed to performing bank transactions by machines. Moreover, th

Continued on page 7

ATMs eventually will permit banks to reduce their conventional branch networks by using a combined ATM/videotex system to provide a full range of banking services.

The increasing acceptance of ATMs over the last 5 years substantiates this trend. In 1977, the average number of transactions per machine was 1500 per month. By 1981, the monthly usage had grown to 5000 transactions per month per ATM.

Increased acceptance of a debit card as a substitute for cash could provide an even greater impetus for developing bank-at-home services. Freed from a dependence on cash, banks and customers will be able to conduct a growing proportion of transactions electronically, providing even greater advantages to a videotex service.

Shop-at-home services provide a second major area of transaction revenue. Rising real estate, building, energy and capital costs have increased the costs of conventional retail operations and spawned competing service concepts. Warehouse supermarkets, providing a limited range of goods which are displayed simply at low cost, have captured a significant share of the retail food market since their emergence in the early '70s. These may represent precursors to the electronic supermarket in which orders are entered from a shop-at-home videotex list and filled using modern, labor-saving inventory management systems and an efficiently organized delivery system.

Although speculative at this time, such a concept attacks more of the critical cost areas in retailing than does the warehouse concept alone.

The increasing share of mail-order services in the retail market is another favorable indication for the viability of videotex. The volume of mail-order business has increased massively, from an estimated $12 billion in 1975 to $26.2 billion in 1978. This development in retailing is a reflection of continuing economic and social trends such as the increased participation of women in the labor force, increased shopping activity by males, fewer full-time homemakers and, associated with all this, increasing dissatisfaction with time-consuming traditional shopping.

A number of cable systems already have organized shop-at-home services featuring video demonstrations of products, combined with telephone ordering. Such services would complement a videotex shop-at-home service and permit more efficient order entry. A videotex catalog, promoted on a cable video channel, also could be a powerful marketing device and would facilitate impulse purchasing.

Table 1

	Cabletext	Telephone-based system
IRR* with optimistic revenue projection	34%	47%
IRR with conservative revenue projection	7%	10%

* Real internal rate of return based on inflation-free projections of costs and revenues

Six different videotex revenue sources are considered in this research: direct expenditures by subscribers, primarily on information services; advertising; fees from financial transaction services; fees from retail (shop-at-home) transactions; messaging; and miscellaneous supplier-financed services, such as on-line information and reservation systems.

The estimates of average per-household revenues are summarized in Figures 3 and 4. The revenue estimates were derived from the data on the total size of each relevant area of economic activity, together with a detailed analysis of substitutability between videotex and existing information and communication media. This method of deriving the revenue estimates is conservative, in that a new communication medium with exceptionally attractive qualities can generate additional revenues as well as divert them from other communications media.

However, these revenues must come from somewhere. When the revenues come from households, they must be diverted from somewhere in the household's existing budget. Analyses carried out in the United States, Canada and the U.K. show that the proportion of household budgets spent on information and communication goods and services has remained stable over time. Consequently, it would not be prudent to base a videotex business plan on the expectation of any major reallocation of the household budget. It is more realistic to assume that households' expenditures on videotex will be diverted from other information-related goods and services. Similarly, other sources of revenue for videotex can be analyzed by estimating the likely diversion of funds from existing non-electronic businesses. The overall revenue estimates for videotex are built from a series of such studies of different revenue sources.

The next stage of the analysis involved building a model of a videotex system operator's costs, and combining it with the revenue estimates to yield overall indicators of the return on investment. This is done for two cases. The first was a residential cabletext system including two-way videotex capability, in which the system operator supplies the user terminals, built into the cable converter. The second was a telephone-based videotex system in which the system operator does not pay for the terminals. The terminals are assumed to be videotex terminals, videotex adapters, videotex-equipped television sets or personal computers owned or rented by households.

The analysis results are shown in Table 1 for two sets of variant revenue assumptions: one optimistic and the other conservative. The optimistic revenue estimates imply very high rates of return but are clearly at the upper boundary of possible outcomes. While the conservative projection is probably closer to the most likely outcome, it is probably too low. The structural assumptions and numerical parameters involved in deriving these results are explained in the text of the report.

Profitable operation of videotex systems is well within the range of practical possibility: real rates of return (as measured by the internal rate of return calculated by standard discounted cash flow methods) in the range of 10% to 20% (corresponding to an accounting rate of return of 20% to 30% if inflation runs at 10%) appear attainable. Even allowing for the high degree of risk involved because the cost and revenue estimates are untested in practice and there are heavy negative cash flows in the early years, it is likely that this would be acceptable to many potential corporate investors, given their known minimum acceptable rate of return.

The range between the best and the worst result does, however, highlight the continuing uncertainties that can be reduced only by the combination of operational experience and further detailed analysis.□